

## deep VIA etch

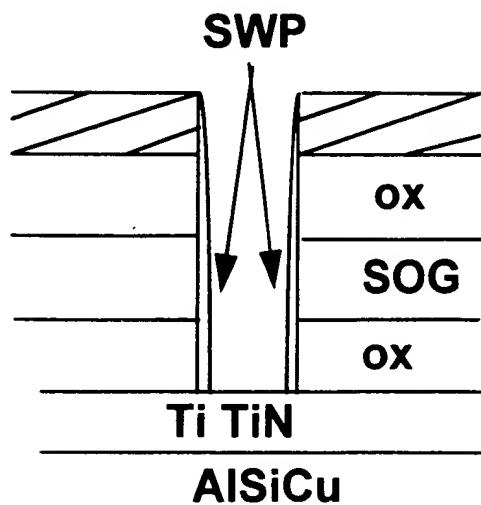


Figure 1: Schematic representation of deep via etch structure (not to scale)

## Al-Overetched

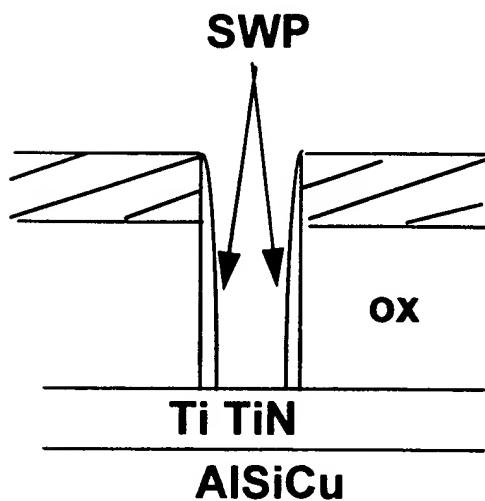


Figure 2: Schematic representation of Al overetched via structure (not to scale)

## Gasphase set-up

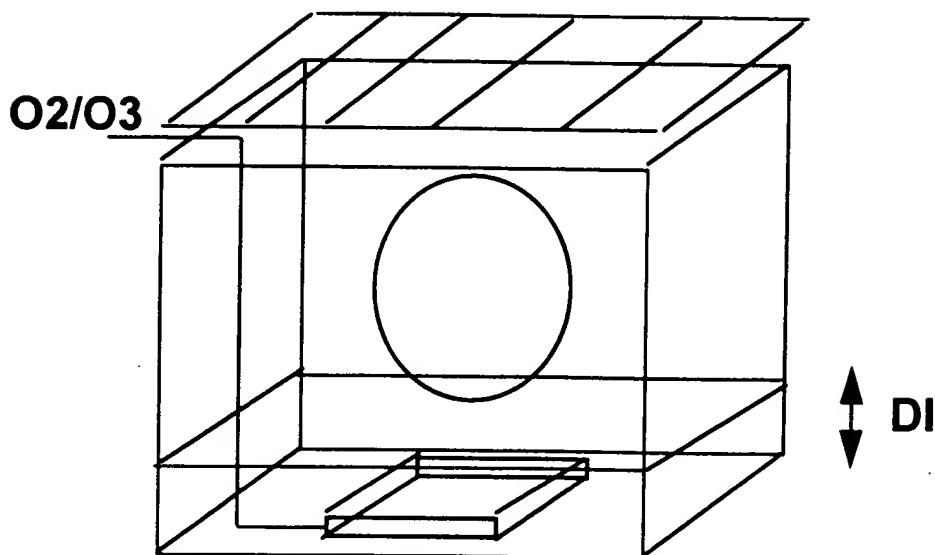


Figure 3: Moist gas-phase experimental set-up

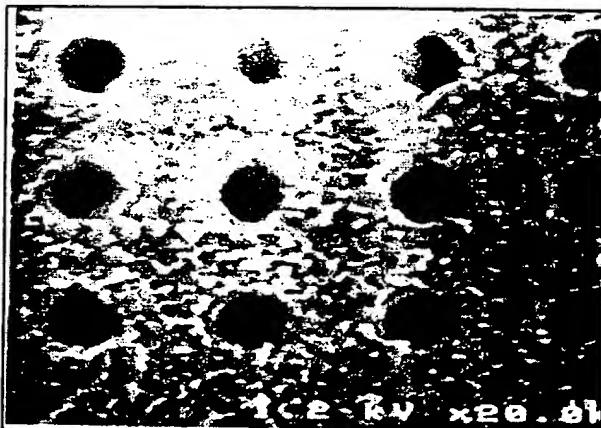


Figure 4: SEM micrograph of via structure prior to any cleaning treatment.

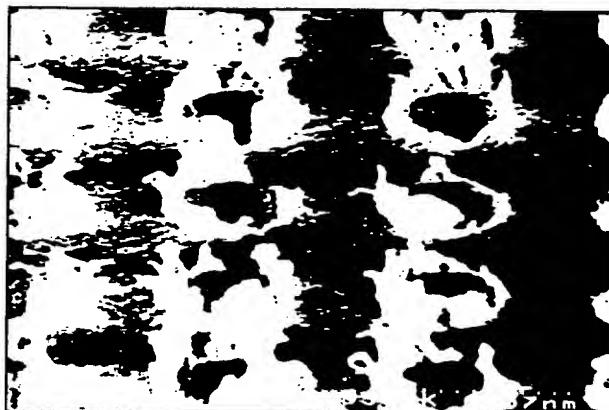


Figure 5: SEM micrograph after 45' O<sub>2</sub> dry strip

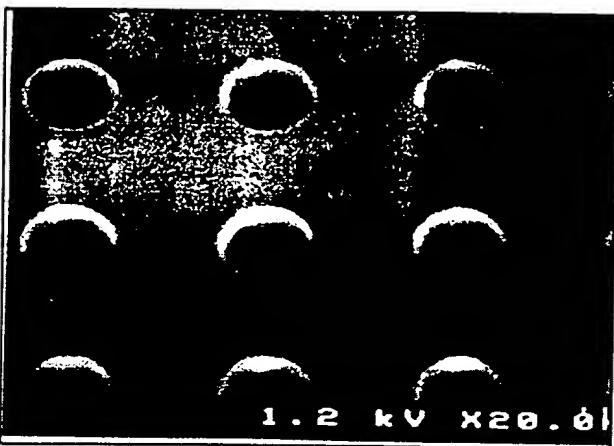


Figure 6: SEM micrograph of deep via (figure 1) after 10' exposure to moist ozone gasphase process with acetic acid spiking.



Figure 7: SEM micrograph of Al overetched via (figure 2) after 10' exposure to moist ozone gasphase process with acetic acid spiking.

## Bubble set-up

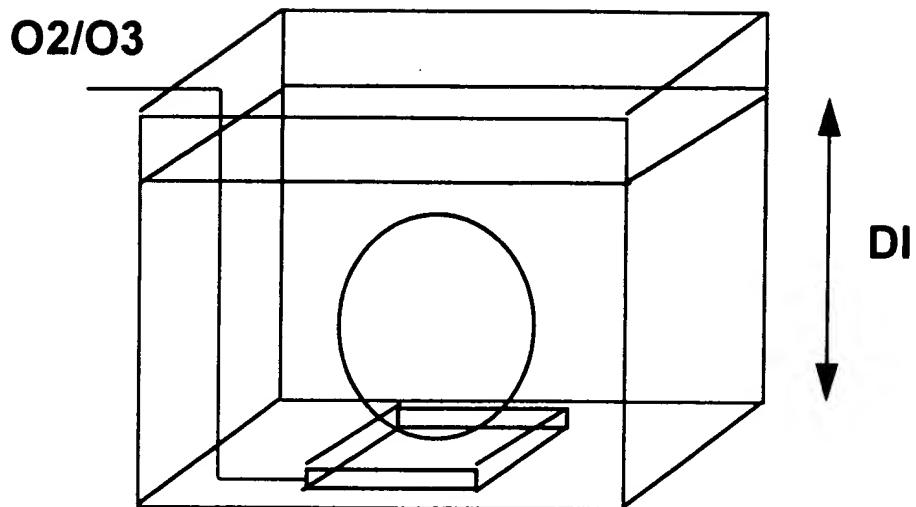


Figure 8: Ozone bubble immersion experimental set-up

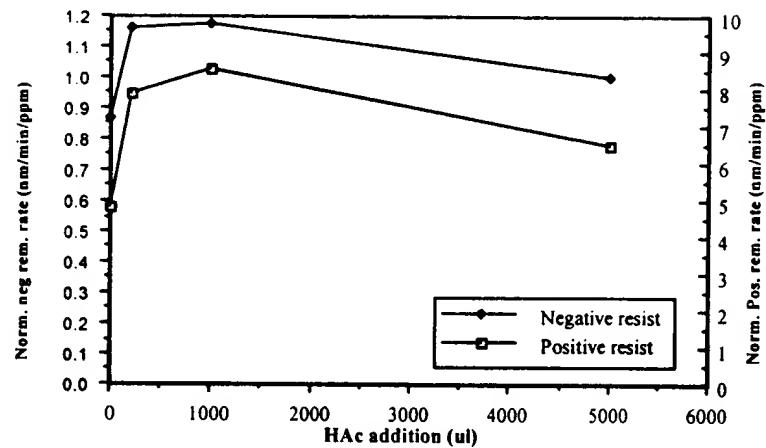
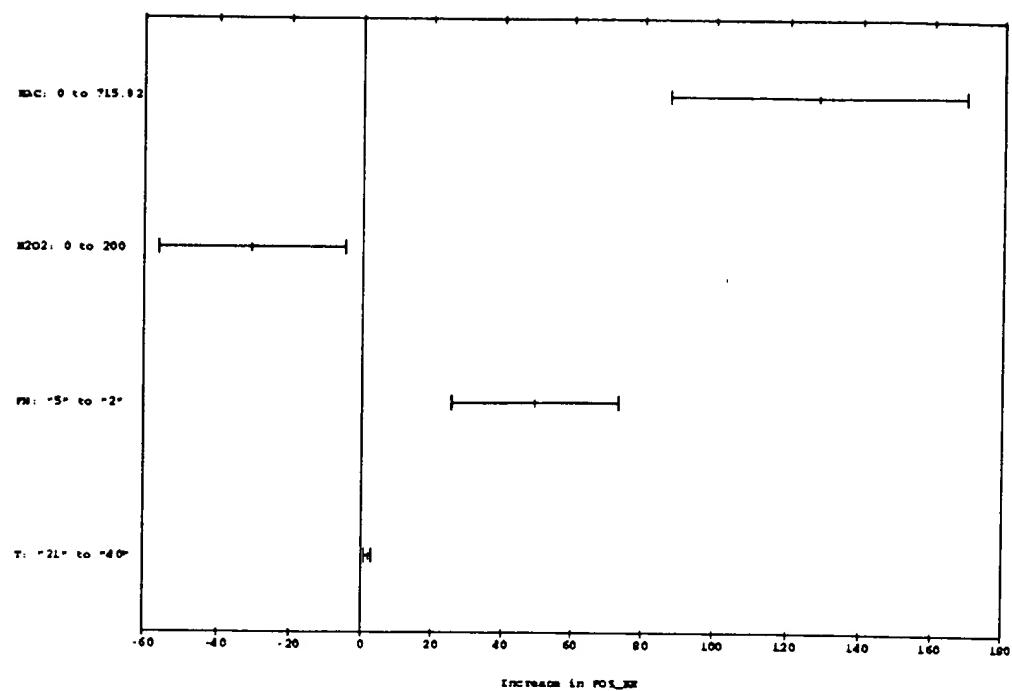
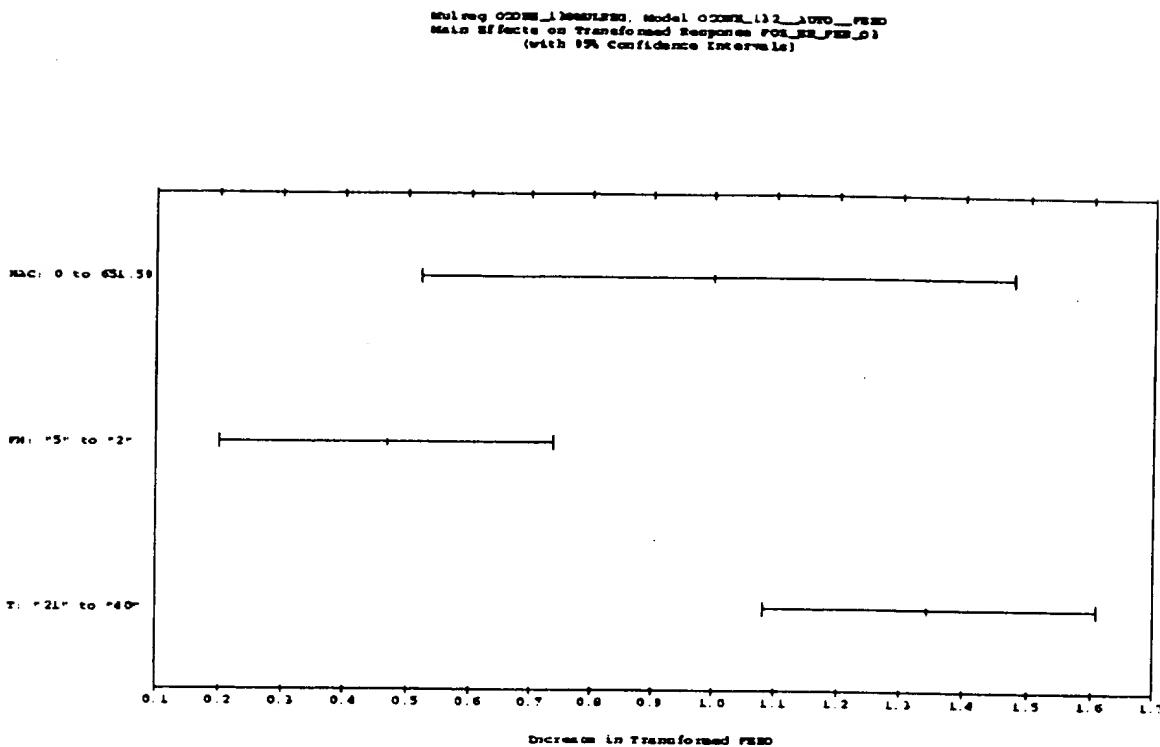


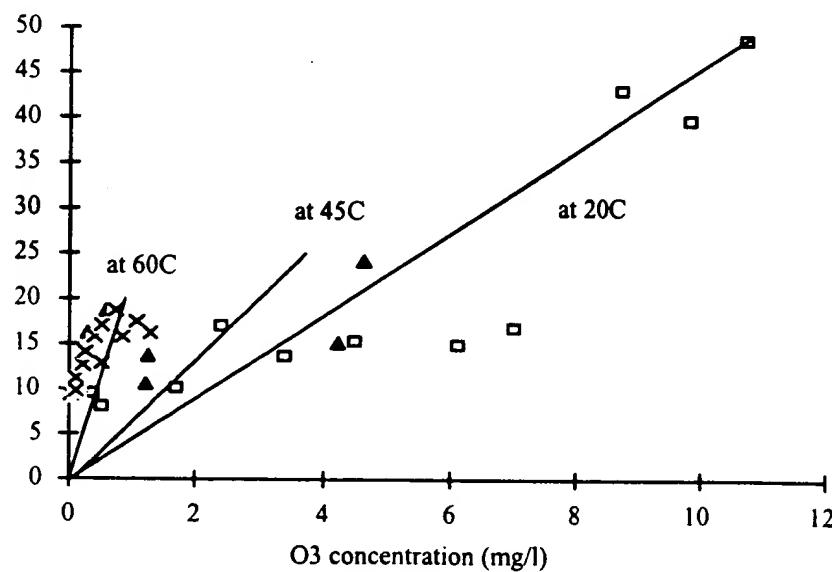
Figure 9: Resist removal process efficiency number (nm removal / process time \* ozone concentration) for positive and negative resist removal as a function of acetic acid concentration.



**Figure 10:** Main parameter effects on resist removal rate (nm removal / process time) for positive resist removal (with 95% confidence levels).



**Figure 11:** Main parameter effects on resist removal process efficiency number (nm removal / process time \* ozone concentration) for positive resist removal (with 95% confidence levels).



**Figure 12:** Resist removal efficiency as a function of temperature and ozone concentration for a static system.

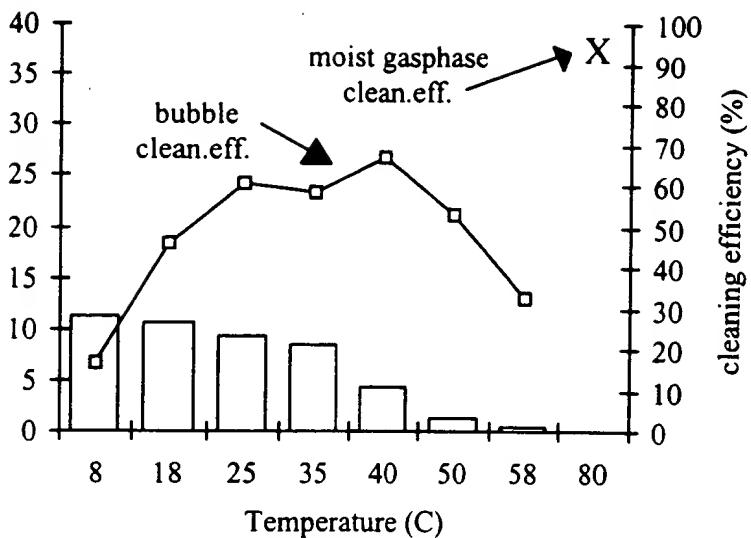


Figure 13 Resist removal efficiency as a function of temperature and ozone concentration for bubble and moist gasphase set-up.

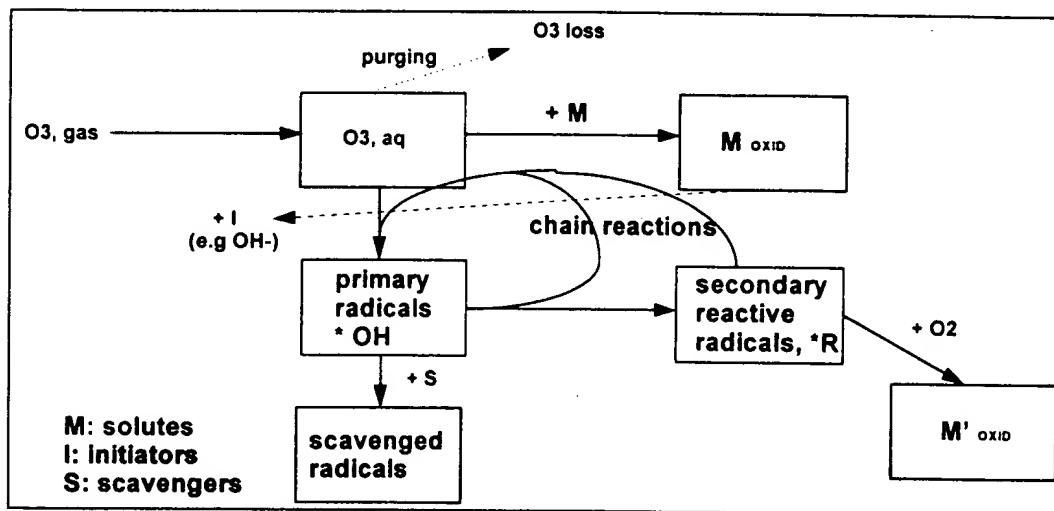


figure 14: Scheme of reactions of aqueous ozone.

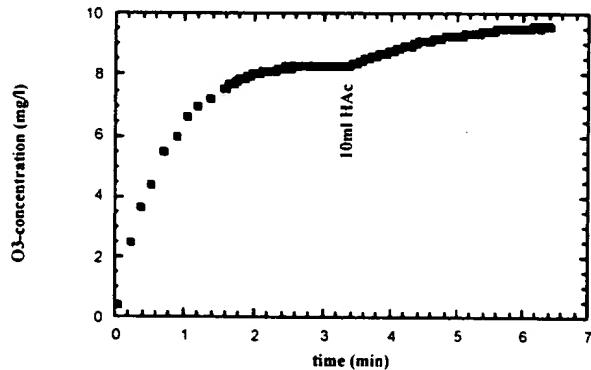
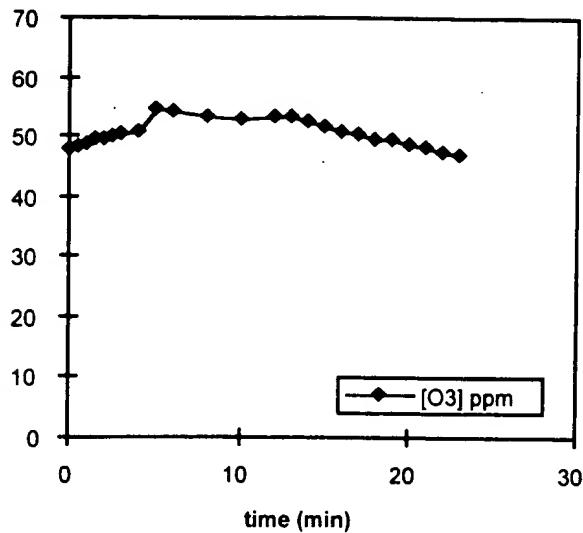


Figure 15: effect of OH radical scavenging on ozone concentration in a overflow tank.



**Figure 16:** effect of repeated addition of H<sub>2</sub>O<sub>2</sub> (0.17mmol/l at t = 0, 13, 20, 24 min) to a DI water solution spiked with 0.23mmol/l of acetic acid.